

## EPA Official Record

**Mail ID:** bccbcbcf1aec435e88d68976f59d5102

**From:** Jetter, James

**To:** iocko@edf.org

**Copy To:** rchiang@cleancookstoves.org; jtweddell@cleancookstoves.org; svaldez@unfoundation.org; Mitchell, John

**Delivered Date:** 09/13/2013 09:41 AM EDT

**Subject:** RE: Environmental Defense Fund Request for Help with Cookstove Testing

Hi Ilissa,

Thank you. The Chulika looks similar to Envirofit and StoveTec/EcoZoom stoves – do you know if the Chulika is manufactured (or parts are manufactured) by these companies?

Regards,  
Jim

**From:** Ilissa Ocko [mailto:iocko@edf.org]  
**Sent:** Wednesday, September 11, 2013 4:24 PM  
**To:** Jetter, James  
**Cc:** Ranyee Chiang; Jennifer Tweddell; Stephanie Valdez; Mitchell, John  
**Subject:** RE: Environmental Defense Fund Request for Help with Cookstove Testing

Hi Jim,

Thanks again for all of the useful information. The cookstove name is “Chulika.”

Best,  
Ilissa



**Ilissa Ocko, Ph.D.**  
High-Meadows Post-Doctoral Science Fellow

**Environmental Defense Fund**  
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T 212 616 1228  
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**From:** Jetter, James [mailto:[Jetter.Jim@epa.gov](mailto:Jetter.Jim@epa.gov)]  
**Sent:** Friday, September 06, 2013 3:29 PM  
**To:** Ilissa Ocko

**Cc:** Ranyee Chiang; Jennifer Tweddell; Stephanie Valdez; Mitchell, John  
**Subject:** RE: Environmental Defense Fund Request for Help with Cookstove Testing

Dear Ilissa,

Sorry for the delay, but following are my responses to your questions:

1. Do you know of reliable testing sites in the U.S., Europe, or India?

A list of stove testing sites with contact info is below (at the bottom) – these sites vary greatly in their capabilities – most do not (yet) have the capability to measure BC. There are other organizations (not on the list) that have capability to measure black carbon, but sites that I know have capability for measuring black carbon emissions specifically from cookstoves are:

- University of Illinois
- Berkeley Air Monitoring Group
- Colorado State University
- Lawrence Berkeley National Laboratory
- U.S. EPA

2. What is the technology that reduces black carbon emissions? Is it something simple that captures the BC? If so, what is the cost for this specific technology?

Improved combustion technologies can reduce soot (black carbon) emissions. There may be other innovations, but some technologies that can potentially reduce black carbon emissions are:

- Forced-draft combustion (e.g., fan stoves)
- TLUD (top-lit up-draft) combustion (especially with processed solid fuels, such as pellets)
- Liquid (such as alcohol) and gas (such as LPG and biogas) fuels
- Solar cookers

These technologies must be carefully designed and implemented to reduce emissions – we’ve seen some examples of these technologies that do not reduce emissions. I think technologies that capture BC (e.g., filtration, electrostatic precipitation, scrubbers, etc.) are unlikely to be practical for cookstoves.

3. We have explored some options for measuring BC emissions that are somewhat accessible, such as a SIDEPAK™ AM510 Personal Aerosol Monitor or using a self-designed real-time sampling system - the ARACHNE (Ambulatory Real-time Analyzer for Climate and Health related Noxious Emissions) - where real-time scattering and absorption coefficients of emitted particles can be measured using a single wavelength nephelometer and a 3-wavelength Particle Soot Absorption Photometer, respectively. Are you familiar with these measurement techniques, and if so, what is your assessment of them?

Accurately measuring BC emissions is a complicated issue:

<http://www.atmos-chem-phys-discuss.net/13/9485/2013/acpd-13-9485-2013.html>

Recommendations for the interpretation of "black carbon" measurements. A. Petzold et al. Atmospheric Chemistry and Physics Discussions (in review)

The TSI Model AM510 SidePak Personal Aerosol Monitor measures particulate matter, but not BC specifically. I have not used this device, but it is based on a light-scattering sensor, similar to some other relatively low-cost devices. Light-scattering sensors are not sensitive to very small soot particles – the sensors do not “see” the smallest ultrafine particles.

The ARACHNE system was developed by the University of Illinois for measuring emissions in the field. I think it was (is) a good system, but I’m not sure if it is available to users outside of the research group that developed it.

I think the easiest method for indicating black carbon may be the transmissometer:

[http://www.mageesci.com/sootscan\\_model\\_ot21\\_transmissometer/sootscan\\_model\\_ot21\\_transmissometer.html](http://www.mageesci.com/sootscan_model_ot21_transmissometer/sootscan_model_ot21_transmissometer.html)

Many of the testing centers listed below are already using (or are planning to use) the gravimetric (filter) method for measuring PM (particulate matter) emissions. The same filters that are collected to measure PM may be used to indicate BC with the transmissometer.

We are using the thermal-optical method to analyze particulate matter for OC (organic carbon) and EC (elemental carbon) – an indicator of black carbon. This is a relatively high-cost method.

We are also using an aethalometer to measure BC:

<http://aethlabs.com/microaeth>

This is a relatively low-cost device designed to measure ambient (low) levels of BC, but we are using a relatively high-cost system to accurately dilute the emissions to a level that can be consistently measured with the aethalometer.

We are also using relatively high-cost instruments to characterize light absorption and light scattering of particles at multiple wavelengths in real-time:

<http://www.dropletmeasurement.com/products/airborne/PASS-3>

<http://www.ecotech.com/particulates/3-wavelength-nephelometer>

Hope this is helpful.

What types of cookstoves has EDF distributed to homes in India?

Regards,  
Jim

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**From:** Ilissa Ocko [<mailto:iocko@edf.org>]  
**Sent:** Monday, August 26, 2013 10:47 AM  
**To:** Jetter, James  
**Subject:** Environmental Defense Fund Request for Help with Cookstove Testing

Dear Mr. Jetter,

I am a scientist at the Environmental Defense Fund. I recently received your contact information from Dr. Jennifer Burney as someone who has done a lot of testing on existing cookstove technologies and is a leader in the standardization of testing.

I am reaching out because I have a few questions about cookstoves that I am hopeful you will be able to help us with. EDF has currently distributed 80,000 cookstoves to homes in India, but the cookstoves have only been tested for thermal efficiency. Before they continue to deploy cookstoves, they would like to have the cookstove tested for soot efficiency to see how much their specific cookstove technology reduces black carbon emissions.

My questions are as follows:

4. Do you know of reliable testing sites in the U.S., Europe, or India?

5. What is the technology that reduces black carbon emissions? Is it something simple that captures the BC? If so, what is the cost for this specific technology?
6. We have explored some options for measuring BC emissions that are somewhat accessible, such as a SIDEPAKTM AM510 Personal Aerosol Monitor or using a self-designed real-time sampling system - the ARACHNE (Ambulatory Real-time Analyzer for Climate and Health related Noxious Emissions) - where real-time scattering and absorption coefficients of emitted particles can be measured using a single wavelength nephelometer and a 3-wavelength Particle Soot Absorption Photometer, respectively. Are you familiar with these measurement techniques, and if so, what is your assessment of them?

If you prefer discussing over the phone, I am more than happy to do so. We sincerely appreciate your time and any help that you can offer.

Best,  
Ilissa Ocko

**Ilissa Ocko, Ph.D.**

High-Meadows Post-Doctoral Science Fellow

**Environmental Defense Fund**

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